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National Aeronautics and
Space Administration
Marshall Space Flight Center

MSFC Microgravity Science &
Applications Department

Telescience Support Center (TSC) at MSFC

SAE International Conference on Environmental Systems (ICES)

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Agenda

- MSFC Implementing Center role for MRPO
- Concept
- Functionality
- Staffing
- Scale
- Issues/Concerns

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MSFC Implementing Center for MRPO

MSFC Microgravity Science &
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- **MSFC is assigned authority and responsibility to manage and execute the Micogravity flight and ground projects within the:**
  - **Materials Science**
  - **Biotechnology Science**
  - **Glovebox Program**

  for the Microgravity Research Program.

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MSFC Facilities and Payloads

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- **Materials Science**
  - Glovebox Experiments
  - Materials Science Research Facility (MSRF)
- **Biotechnology Science**
  - Glovebox Experiments
  - PCG (STES, BAG, EGN)
  - DCPCG
  - OPCGA
- **Glovebox Program**
  - Microgravity Science Glovebox (MSG) Facility
  - Middeck Glovebox

MSFC TSC Concept

- Low cost approach
- Minimize configuration/set-ups
- Utilize latest capabilities in computer workstations (speed, memory size, etc)
- Provide the 3 MSFC science disciplines a dedicated area for their individual science flight payloads and operations
- Plug -n- Play philosophy
  - Consoles, chairs, keysets with headsets, video monitors, video cassette recorders (VCRs), ethernet connections, administration LANs, telephones, fax machine, GMT clocks, etc. are provided by the TSC
  - Disciplines and their Payload Developers (PDs)/users are only responsible for providing their own computer workstations

Functionality

- **MSFC TSC was developed to primarily support:**
  - **Telemetry processing: TReK and GSE**
  - **Commanding: X-window to HOSC**
- **Future enhancements and functionality are being assessed as number of payloads/facilities grows and complexity increases.**

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The Telescience Support Center (TSC) at MSFC

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picture

Standard Console Layout/Services

- Picture of MSFC TSC console

- Voice-Enhanced Voice Distribution System (EVoDS) 48 loops
- Video-Enhanced Video Distribution System (EViDS) 48 inputs X 48 outputs
- TV, Monitor 13 inch
- VCR
- Ethernet (TSC LAN) connection to the POIC Networks-100 Base T
- GMT clocks
- Administration LAN for email and web access
- Telephone
- Fax machine

Documentation

- MSFC TSC Requirements Document
- MSFC TSC Capabilities Document
- MSFC TSC User Handbook
- MSFC TSC Operations Configuration Document
- MSFC TSC Interface Verification & Test Plan

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TSC Flight Operations and Systems Test Integration and Checkout

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- The Microgravity Development Laboratory co-located with the MSFC TSC in building 4493
- Systems Test Integration and Checkout for most of the Microgravity Science and Applications Department flight experiments
  - Microgravity Science Glovebox
  - Materials Science Research Facility
  - Protein Crystal Growth Single Thermal Enclosure System
  - Middeck Glovebox
- Picture
- Scientist, Engineers and Technicians perform:
  - Flight hardware development
  - Component and System level testing
  - Facility/experiment integration testing (prior to shipment to KSC)
  - Ground Control Experiment Laboratory functions (1 g operations)

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MSFC TSC Layout

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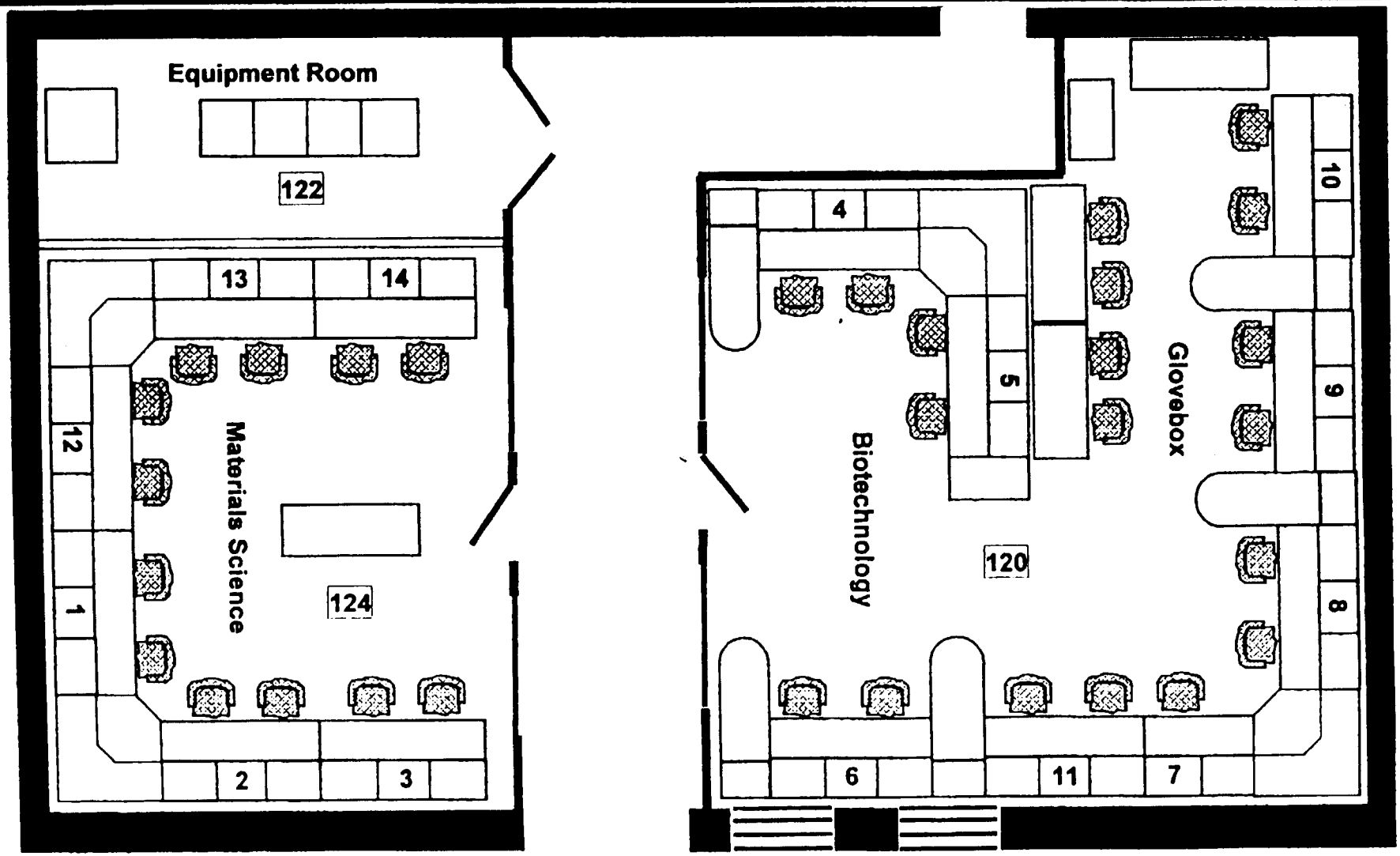

MSFC TSC Building 4493

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Flight Operations Configuration

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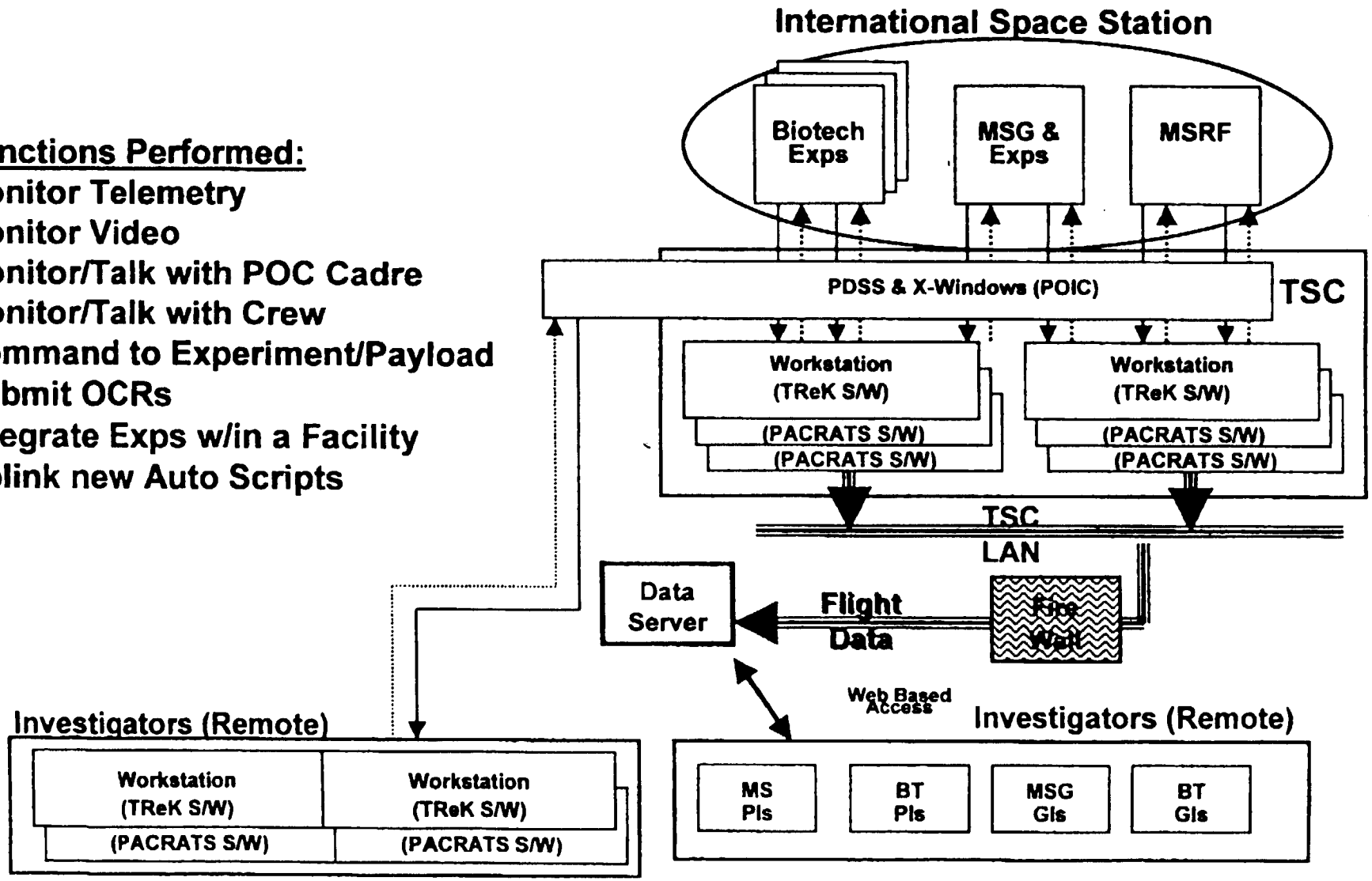
Functions Performed:
Monitor Telemetry
Monitor Video
Monitor/Talk with POC Cadre
Monitor/Talk with Crew
Command to Experiment/Payload
Submit OCRs
Integrate Exps w/in a Facility
Uplink new Auto Scripts



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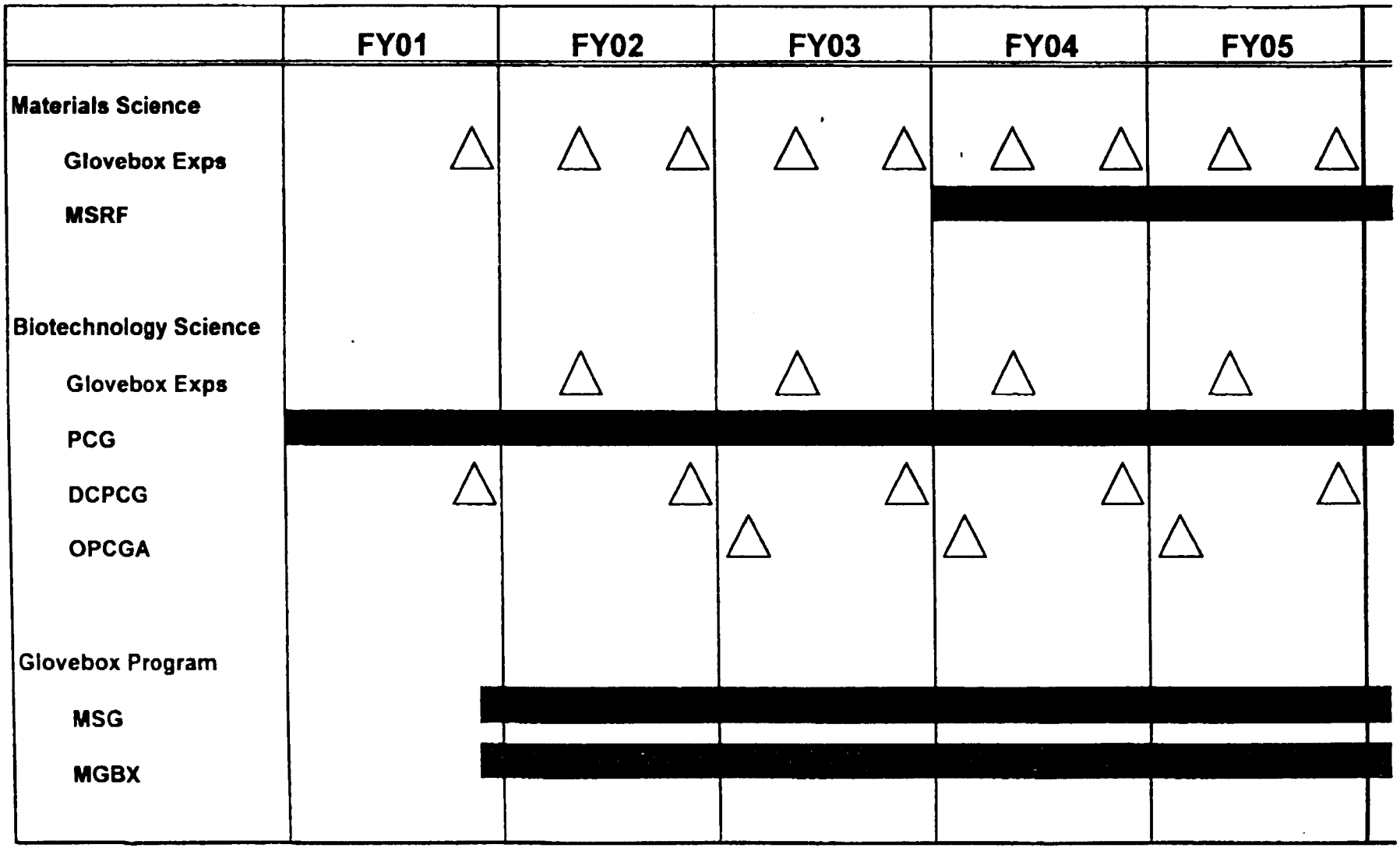
Scale/Payload Deployments

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